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DISEASES OF THE NERVOUS SYSTEM

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

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DISEASES of the NERVOUS SYSTEM

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A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

Psychosomatic Observations on 500 Neuropsychiatric Patients*

LT. COMDR. P. P. POLIAK
(MC) USNR

In the neuropsychiatric departments of our Navy hospitals one is impressed that the great majority of the so-called N-P patients complain not of primary psychiatric symptoms but of somatic symptoms. These patients were admitted to the N-P service largely because preceding medical officers who saw them could find no "organic" basis for their complaints and so tagged them as "functional" or psychogenic.

Coming in direct contact with all these patients with primary psychosomatic complaints reminded the writer of his experiences while on duty at a large induction center a year previously. Vast numbers of selectees examined there complained of headache, backache, dizzy spells, etc. Many brought letters from their family doctors testifying that they had been treated for dyspepsia, suspected gastric ulcer, spastic colitis, etc. They were inducted nevertheless because there were no objective findings at the time and because of pressure of manpower needs. Scientific curiosity was felt as to what became of these "borderline" inductees and some effort was made to check on their subsequent military careers but this was found impossible. As an alternative procedure a check was begun here at the Great Lakes Naval Hospital on the complaints and symptoms of the patients in the N-P Service. What was found, from the psychosomatic point of view, in 500 consecutive patients given N-P discharges from the hospital, is the main subject of this paper.

Although medical men are familiar with the meaning of "Psychosomatic Medicine" it might not be amiss, before presenting the facts and figures that were gathered, to mention a few of the principles and concepts involved. It is universally agreed that there has been entirely too much quibbling over whether a patient's illness is "organic" or "functional." The Mind vs. Body problem is age-old and too tricky and philosophical. Logically there should be no such problem. Mind-Body division is not sound. Biologically no such dichotomy can be made. Consequently, each symptom is both functional and organic; never "either/or." Practically, however, and because of our current division into specialities, we tend to adopt an "either/or" working attitude, even while recognizing the need of looking at the functioning body as a whole. It is precisely the dynamic recognition of this need which has led to the birth and growth of the field of medicine referred to as "Psychosomatics."

This term is comparatively new but knowledge of the affect of "mind" upon "body" is old. As far back as 380 B.C. Plato wrote: "For this is the great error of our day in

* Presented at a joint meeting of the Illinois Psychiatric Society and the Chicago Neurological Society, January 6, 1945, at the U. S. Naval Hospital, Great Lakes, Illinois.

the treatment of the human body, that physicians separate the soul from the body." But modern psychosomatics may be said to have begun with the publication in 1915 of W. B. Cannon's classic "Bodily Changes in Pain, Hunger, Fear and Rage." Great added impetus was given to this concept thru Pavlov's monumental investigations and during the past ten years there has been a tremendous upsurge of psychosomatics as reflected in the work and writings of Flanders-Dunbar, Weiss, English, Wolff, Alexander, French and a host of others.

Now we look upon psychosomatics as the liaison field between neuropsychiatry and medicine or perhaps as the offspring resulting from the marriage of medicine and psychiatry. In a general way it may be defined as that clinical field which studies what emotions can do to the body by stimulating abnormal functioning and producing lesions via the autonomic and endocrine systems.

This paper is by no means intended as a complete or analytical survey. The work in compiling and tabulating the material was of necessity done hurriedly at odd moments and for the most part the information was obtained from ward charts and health records, rather than directly from the patients. Hospital records, especially during war time, are often woefully incomplete and individual differences among the various recorders makes for non-uniformity in recorded impressions and alleged facts. The following tables, nevertheless, give facts and figures as they were found.

As is well known, mental and emotional states can and do influence any and all body systems. Table 1 shows the number of complaints according to the body systems. Altogether there were 62 different individual complaints among the 500 patients, but these have been grouped into "systems." The symptoms of headache, weakness and fatigue were grouped separately since they could not be properly listed elsewhere.

It will be noted that excluding the nervous system and the single complaint, "headache" the gastro-intestinal system ranks first among the systems shown. This agrees with statements found frequently in literature to the effect that G-I disturbances are

TABLE I.

COMPLAINTS BY BODY SYSTEMS OF 500 N-P PATIENTS

Body System	Number Patients	Symptoms
G-I	126	Nausea and vomiting, abdominal aches & pains, diarrhoea, etc.
Cardio-Vascular	88	Syncope, dizzy spells, "black-outs," heart pains, etc.
Skelatal-Muscular	71	Backache, joint and muscle pains, etc.
EENT	14	
Respir.	11	Chest pains, dyspnoea, etc.
G.U.	10	Kidney and scrotal pains, urinary bladder complains, enuresis.
Derm.	6	
N-P	217	"Nervousness," tremors, epilepsy, somnambulism, amnesia, etc.
Headache	142	
Weakness		
Fatigue	31	
Misc.	23	

Complaints in 1 system.....238
Complaints in 2 systems.....185
Complaints in 3 or more systems.... 77

Patients with N-P complaints exclusively ..... 89 or 17.8%
Patients with Psychosomatic complaints ..... 411 or 82.2%

TABLE II.

OF THE 500 PATIENTS:

126 or approx. 25% had some G-I symptoms.
51 or approx. 10% had G-I symptoms as predominant admitting complaint.
21 or approx. 4% had G-I complaints exclusively.

ANALYSIS OF 50 CASES WITH PRIMARY G-I SYMPTOMS

Admitted directly to N-P service ..... 15 or 30%
Admitted via referrals from other services ..... 35 or 70%
Average age of patients ..... 26½ years
Acknowledged history of G-I symptoms EPTE ..... 43 or 86%
Length time symptoms EPTE .... 0 yrs. (7 pts.) to lifetime (10 pts.)
Average (excluding 0 and lifetime) ..... 6½ years
Length of patient's prior service, average 5 months

History of medical treatment for G-I complaints PTE 18 or 42%

Ulcer management 12
Appendectomy 5
Cholecystectomy 1

History of proved organic G-I pathology PTE ..... 3 (X-ray evidence of duodenal ulcers)

among the most common manifestations of emotional stress. It is also in keeping with the ancient idea that "The bowels were the seat of the soul (or the emotions)."

Since the G-I complaints were most prominent in our system series, and since sufficient time to analyze all 500 cases was not available, those patients with predominately G-I symptoms were singled out for special study. The Tables II to VI enumerate what was found in this group:

It is noted in examining Table II that 86% of the patients gave a long history of somatic or psychosomatic symptoms at the time of their induction examination. After they were inducted they averaged only 5 months of service (barely beyond the training period) when hospitalized, and eventually discharged, because of these same symptoms.

As a matter of general interest the specific types of gastro-intestinal complaints among the 50 patients studied are itemized in Table III.

As noted in Table II, 35 (70%) of the 50 gastro-intestinal complaint patients were first admitted to the medical or surgical services of the hospital and later transferred to the neuropsychiatric service. Table IV shows the original admitting diagnosis of the entire 50 patients who were first admitted with G-I symptoms.

I make no attempt to analyze the psychodynamics involved in the psychosomatic complaints and symptoms under discussion. There is merely a tabulation of objective findings. An obvious conclusion to be drawn, however, is that our diagnostic practices can be considerably improved upon.

To be listed questionably as "objective findings" is this Table VI of arbitrarily designated personality types as noted in the 50 patients with primary gastro-intestinal symptoms.

As expected we find that the majority of our G-I complaining patients are of tense, anxious, hypertonic, worrying disposition—the well known and oft described "ulcer" or "dyspeptic" type. These patients in the main had an ulcer type syndrome whereas the inadequate sort of personality usually had

TABLE III.

BREAKDOWN OF SPECIFIC COMPLAINTS IN G-I SYNDROME

(Each patient had a combination of 2 or more complaints)

Complaint	Number
Vague G-I symptoms; general epigastric and abdominal distress or discomfort; indigestion	23
Nausea	22
Definite localized sharp or burning abdominal pain	15
Vomiting	14
Cramps	11
Anorexia	7
Diarrhoea	4
Gas; belching	4
Heartburn	2

TABLE IV.

ADMITTING DIAGNOSIS OF REFERRED CASES

D. U. (Medical Observation)	15
D. U. (Ulcer, duodenum)	7
Neurosis, gastric	4
D. U. (Appendicitis)	3
Colitis	2
Dysentery, unclassified	1
Enteritis	1
Duodenitis	1
D. U. (Intestinal Obstruction)	1

TABLE V.

FINAL (DISCHARGE) DIAGNOSIS

Psychoneurosis, Unclassified	15
Psychoneurosis, Anxiety Neurosis	13
Neurosis, Gastric	7
Psychoneurosis, Mixed	4
C.P.S. Inadequate Personality	3
C.P.S. Emotional Instability	2
Psychoneurosis, Hysteria	2
Mental Deficiency	1
Enuresis	1
Somnambulism	1
C.P.S. Schizoid Personality	1

TABLE VI.

TYPE	Number
HYPERTONIC (Tense, restless, anxious, chronic worrier, conscientious)	20
INADEQUATE (Emotionally unstable, poor social adjustment, poor general record, low energy coefficient, dependent)	17
RIGID (Obsessive, compulsive, trends)	4
HOSTILE (Irritable, excitable, quick tempered)	3
PASSIVE (timid)	3
PARANOID	3

vague unlocalized symptoms, often in two or more body systems.

The following additional salient psychological factors appear in the past histories of most of the patients studied:

(1) History of a domineering parent, and/or

(2) History of sibling rivalry and jealousy—both giving rise to repressed aggression and hostility.

(3) Often the G-I symptoms were the result of conversion mechanism originating from specific traumatic situations or events: e.g., the case of one patient whose periodic stomach aches dated from the accidental shooting in the abdomen of his brother in early childhood; and the returned veteran whose G-I difficulties followed the witnessing of his buddy being bayoneted in the midsection.

(4) Connection between G-I symptoms and repressed resentment and aggressive tendencies toward authority in general was observed.

(5) The equation of vomiting and diarrhoea-rejection was found frequently.

Upon considering the phenomena of persistent bodily complaints without sufficient "organic" justification, one concludes that the essence of psychosomatics is the fixation of attention on subjective physiological sensations or disturbances and an exaggerated reaction to stimuli. The human machinery is intricate and complex and there is a delicate balance between organism and environment requiring constant adjustments. All of us experience uncomfortable physiological manifestations—vague bodily sensations, transitory pains, palpitation, or neuralgic discomfort, etc. If we are "normal" or normally occupied we pay little heed to them. The unhappy, the ruminative, the neurotic, however, fixate on them and by this fixation these bodily manifestations assume major proportions.

In the military service, morale is often the factor which determines whether a physical discomfort becomes militarily disabling or disqualifying. Just what is "morale"? We all know what it is even though we find it difficult to define. The dictionary is not too helpful. It defines morale as "a mental state or condition dependent upon such factors as zeal, spirit, pride in duty, enthusiasm, confidence, discipline, hope and courage."

Why should complaints such as headache, backache or stomachache, become disabling in the Service when in civilian life they did not interfere with the complainer earning a livelihood or living an average normal life? Of course there are the unconscious mechanisms involving psychosomatic conversions in times of emotional stress—"frightened people seeking refuge in physical symptoms"—but the answer rests also with the matter of conscious motivation and morale. It is common observation that the rate of so-called functional disorders is inversely proportional to the degree of morale.

In this matter of motivation and morale there are two principal elements: (1) Early training and conditioning. (2) Attitudes reflected by environmental conditions and situations. As nearly as we can learn, the Germans and the Japs, and the Russians on our side do not have nearly the number of neuropsychiatric casualties that we do. These peoples have been conditioned to war. Individual human life and comfort are regarded by them as far less important than they are here in America. There, the individual is considered unimportant as compared with the good of the state. Here the welfare and rights of the individual are primary values. Symptoms are individual things and as individuals we tend to express them more. The present generation of most European and Asiatic nations has been brought up to "live dangerously" and are conditioned to the stress and to the perils of all that war involves. We Americans on the other hand have been conditioned to peace. We were brought up to abhor war and with the slogan "Safety First" ringing in our ears. Our lives have been more pleasant and comfortable. We have more to give up, more to live for.

For many it is hard to understand why we must travel 3,000 miles to fight for our freedom. It is common opinion that if the war came to our shores there would be fewer N-P casualties. Fighting concretely, rather than abstractly, to protect and defend one's

home becomes a potent motivating force.

It has been our experience with N-P casualties at the Great Lakes Naval Hospital that the bulk of patients come from two sources: (1) The Training Center, and (2) from overseas. In group 1 the majority of the cases are drawn from the O. G. U. and the Primary Service Schools. Here are the men just returned from "Boot Leave." They were carried through Recruit Training by the general momentum of the training schedule and by the motivation of getting home in uniform for their "Boot Leave."

At home they see life going on as usual. Some of their friends are holding down good jobs, earning big money. Life at home appears sweet and comfortable. Back again in O. G. U. or Service School, they begin to reflect on what they think are inequalities of burden and the fear of near future threats to life and ego begins to make itself felt. Then psychosomatic mechanisms come into play.

In group 2, the returnees from combat areas, we see many of course who are sick as the direct result of their war experiences. There are many more who are in fair shape when they arrive within our continental limits and are in just as good shape when they depart on 30-day convalescent leave. But when they return from this leave, they say they are not well enough to return to duty—even limited duty. They give expression to a large variety of complaints which previously were unvoiced. Why?

In almost every instance these men had resentful and bitter attitudes. They felt they had been treated unfairly, were "shoved around" too much and had already done their share or more. When they returned to this country for a well-deserved respite, their morale took a sharp upsurge. Ever since their induction, they had been carried thru the rigors of training and the terrors of battle by the hope and human yearning to return home. Once back, however, things somehow seem "different." There is disappointment, disillusionment and dissatisfaction. Amongst the civilians at home they see attitudes and behavior they don't like. They see all about them evidence of prosperity, complacency and selfishness. The man thinks of his experiences over there—facing death or mutilation day and night, sweating in the insect-ridden jungles or shivering with cold, or lying wet and miserable in mud for days and living on K-rations. Feeling of resentment and bitterness are disproportionately aggravated. His morale reaches a low ebb. He expresses himself as being "fed-up." Sometimes he frankly says so, but more often his resentment is suppressed or repressed. When repressed, it becomes converted to physical manifestations and we have our patients with psychosomatic conversion symptoms. It is this low morale and motivation in the direction of returning to enjoy the pleasures and benefits of the life to which some of our patients have been conditioned which results in many physical complaints. A substantial percentage of men who are separated from the Service are individuals who could not adjust adequately to service conditions.

The foregoing remarks in regard to morale refer only to a small segment of the N-P patients under consideration, and not to the servicemen as a whole. As a matter of fact, the morale of the Armed Forces as a unit is surprisingly good.

In the strictly psychosomatic phase of this discussion, what conclusions may be drawn from the data presented? What can be pointed out and emphasized as the implications of Psychosomatic Medicine? Neuropsychiatrists as a whole are well aware of these implications but it is doubtful if the majority of general practitioners and specialists in other fields are, though there has been an evergrowing awareness and understanding in recent years.

It is important to be aware that there is a psychic or "functional" element in practically every illness. "Functional" and "organic" may and often do exist at the same time. This calls for cooperation and understanding among the psychiatrist, internist, and surgeon. Too often does the inability to detect structural disorders lead one to question or minimize the validity of the patient's complaints or to doubt the existence of a genuine illness; and too often does the labeling of a symptom as "functional" carry with it the implication of "imaginary,"

which does a grave injustice to the patient and serves to impede further proper investigation. It is to be borne in mind that "functional" disturbances, if sustained, may lead to actual pathological structural change, such as gastric ulcers, ulcerative colitis, etc. On the other hand, failure to recognize the primary psychic factor in a complaint or symptom frequently leads to needless surgery and tedious, time-consuming medical procedures. This does not imply that all effort should not be made to rule out organic disease before establishing a psychiatric diagnosis.

At the Great Lakes Naval Hospital a sound psychosomatic attitude resulting in close cooperation between the Neuropsychiatric Department and other departments has been developed. Among other benefits, this recognition of psychosomatic principles has served to expedite the disposition of countless patients who otherwise might still be bouncing between medicine and psychiatry with the problem unsolved as to whether the illness is "functional" or "organic."

The facts and figures are presented to illustrate what happens to men who are inducted into the Service in spite of confirmed histories of psychosomatic symptoms. Such histories are clear indications of basic instability and are portents of later N-P casualties.

A combination of underlying psychosomatic conversion patterns with low morale and negative motivation is the perfect set-up for the psychiatric casualty—the fellow who has been a liability to the Service ever since induction with his repeated visits to sick call and his poor performance of duty; the fellow who is now cluttering up one-fourth of our sorely needed hospital space; the fellow who is going to cost our government many thousands of dollars in veterans' care and compensation. The task of N-P screening is a difficult one but the screen must be made fine enough to exclude the unfit and potentially unfit in spite of the manpower needs. A poor sailor is worse than none at all. In putting into effect the current ideas regarding a National Service Act, these "borderlines" should be assigned to essential war wor kor labor battalions and not to the Armed Forces.

SUMMARY

(1) Psychomatic Medicine is defined and its principles briefly discussed.

(2) 500 N-P patients with psychosomatic complaints are reviewed.

(3) An objective analysis of 50 patients with primary gastro-intestinal symptoms is presented.

(4) The part played by morale and motivation in the production and persistence of psychosomatic complaints is discussed.

(5) The need to screen out selectees with past histories of psychosomatic conversion patterns is stressed.

(6) The desirability of disposing of certain types of "unsuitables" by means other than thru hospitalization and Medical Survey is indicated.

AUTHOR'S NOTE—For assistance in gathering and compiling the data presented, the writer is indebted to Lt. (jg) E. W. Huntley (MC) USN and M. C. Moran PhM 2|c.

The views and opinions contained herein are those of the author and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at large.

The Significance of Sensory Changes in Hemiplegia*

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In the common garden variety of hemiplegia which results from cerebral apoplexy, the motor symptoms are so consistently stereotyped and so outstanding, that sensory changes, if present, are given little or no consideration. The clinician for several reasons is inclined to gloss over any subjective sensory complaints the patient may proffer. Usually such complaints are discounted because the victim of a recent cerebral hemorrhage or thrombosis is confused, more or less aphasic or is regarded as being too senile to give a clear account of his sensory discomfort. Occasionally the story of sensory change is interpreted as the patient's manner of describing the "heaviness" or "deadness" in the paralyzed limbs rather than being a true hypoesthesia or anesthesia.

If the hemiplegic patient is fairly lucid and persists in the complaint of abnormal sensations in the paralyzed parts, it should be assumed that the lesion extends into the sensory tract system. These sensory defects which involve the paralyzed side cannot always be clearly elucidated by the patient, even though he may possess normal mental faculties and adequate descriptive powers. This applies particularly to the individual suffering with a very recent apoplectic episode. In most instances the subjective description suggests a dysesthesia. For both brush and pin-prick stimulus the sensation is called "queer," "peculiarly disagreeable" or "something different" from normal experience. Occasionally the patient will say that the stroke of the brush or the touch of the pin-point is excessively "ticklish." Because the subject cannot always make a definite statement to the effect that the stimulus is either "dull" or "sharp," the disorder may be disregarded as a vagary on the part of an anxious and neurotic sufferer. It is only when the patient consistently claims a total or nearly total loss of some or all qualities of skin sensation, that the occasional record concedes that sensory changes do accompany the hemiplegic defect.

Even more slighted than the sensory skin changes in the average hemiplegic patient are the special sensory disturbances of vision. For the same reasons cited above, the elderly individual who is examined and treated by reason of hemiplegia is rarely questioned as to visual fields or as to acuity of optic function. Nevertheless changes in the visual fields, particularly various degrees of hemianopsia are not an infrequent complication of hemiplegia, especially in the more acute phases. Unfortunately the average patient is not always aware of a partial or even a complete hemianopia, and the deficiency is only detected after various ingenious strategies and elicitations on the part of the examiner. Because the patient is usually too ill or infirm to cooperate in the standardized perimeter test, a crude examination at the bedside may be more fruitful and feasible. If the examiner holds the forefinger of each hand on each side of the head, two inches to the side and in front of each temple and if both are moved quickly through a short arc, the patient usually and readily reveals whether or not he is aware of the movement of both fingers when the gaze is directed forward. A finer testing of the visual fields can be made and the findings confirmed after the patient improves sufficiently to be wheeled before a perimeter.

In a study of 80 patients in Cleveland City Hospital suffering with hemiplegia of varying duration, the examination included a careful consideration of any co-existing sensory and visual field changes involving the paralyzed side. Of this number 61 or 76% offered subjective and objective evidence that sensory changes existed in the hemiplegic area. It is conceded that in more

* From the Neuropsychiatric Service of Cleveland City Hospital, and the Department of Mental and Nervous Diseases, School of Medicine, Western Reserve University.

than half of this number such changes were not constant and consistent findings and in a few patients the disturbance disappeared within one or two days after the ictus. The table below offers a record of the type and frequency of the sensory disorders which were encountered.

Type of Sensory Change	No. of Cases	Per Cent
Skin Changes:		
Anesthesia	13	21
Hypoesthesia	38	62
Hyperesthesia	6	10
Paresthesia	1	2
Mixed Sensory Changes	3	5
Unusual Disturbances:		
Hemianopia	13	21

The fact that anesthesia or some degree of blunting of all qualities of sensation occurred in 84% of all those claiming sensory disturbance in hemiplegia is not out of keeping with the concept that sensory tracts may be frequently involved in lesions extending into the knee of the internal capsule. More surprising is the finding that in 21% there was a definite homonymous hemianopia, either complete or partial in the visual field corresponding to the paralyzed side.

If emphasis is made of sensory changes and visual field defects in hemiplegia, the question may well be posed that assuming such changes exist, what is their significance as to diagnosis and prognosis?

Detection of sensory changes and visual field defects associated with a hemiplegia may well offer an excellent clue as to the position and size of the offending brain lesion. Moreover such associated sensory findings have furnished the investigator with an idea of the identity and distribution of the several arteries which are frequently injured in the apoplectic seizure. Recent investigations have definitely disclaimed the time-worn contention of Charcot that there is one "artery of apoplexy." Injection studies made by Alexander[1] have demonstrated that there exist a series of clumps of arteriolar branches of the middle cerebral artery, any or all of which may produce a hemiplegia.

Some of these so-called striate arterioles supply only motor tracts in the internal capsule, while others penetrate not only into these motor portions of the white matter but also supply the ascending sensory systems and the thalamus. Finally Abbe[2] has clearly demonstrated that one particularly long vessel, the anterior choroidal artery, not only supplies the internal capsule and the sensory tracts entering the thalamus but also nourishes the external geniculate body which is an important synapse in the visual tract.

Sensory changes both in the skin and in the visual field have played an important role in the understanding of some of the mechanisms which determine whether a hemiplegia becomes spastic or remains flaccid and toneless. Speculation over this matter has led to much controversy. Verhart[3] made serial sections in 21 cases of hemiplegia and concluded that the flaccid form occurs only when both the sensory and pyramidal systems are injured. Davidson and Bieber[4] in their studies of cerebral flaccidity in man likewise found hemianesthesia in all their cases of flaccid paralysis and concluded that the sensory lesion producing such a hypotonia may be anywhere from the medulla to the parietal cortex. Certainly this concept of the production of flaccid hemiplegia appears to be more plausible to the clinician than that offered by the Yale group[5] of neurophysiologists who consider this phenomenon to be an expression of injury to the purely motor area of the cortex.

In the present study of 80 cases of hemiplegia, the authors attempted a correlation of sensory changes with the type of coexisting paralysis, largely to determine whether disturbances in sensation are or are not a determinant factor. Of the 80 cases, 58 were classified as being of the flaccid type and 22 were considered to be spastic.

In the flaccid group 51 patients (88%) presented some form of sensory defect while in the spastic group only 10 or 45% complained of some co-existing disturbance in sensation. These figures would indicate that sensory disturbances on the paralyzed side of the body occur twice as frequently in the flaccid forms of hemiplegia as in those with spastic paralysis.

In reference to visual field changes ,a most striking finding was the notation that in the

13 patients so afflicted, the hemiplegia was consistently of the hypotonic or toneless form. In other words in these 13 subjects the clinical findings included the complete triad of flaccid hemiplegia, hemianesthesia and hemianopia. The duration of the paralysis at the time of the examination ranged from one day to ten months. The combination of these three features was regarded as an expression of the syndrome of the anterior choroidal artery. It is of interest to note that Aring[6] who attributes hemiplegic flaccidity to lesions in the motor basal ganglia, tabulated his findings in ten cases of chronic flaccid hemiplegia and recorded that at least 50% of these had some degree of hemianopia.

Since the anterior choroidal artery is one of the most proximal branches of the middle cerebral artery, it is not without reason to conclude that it not only produces the triad mentioned above but that a thrombosis of this vessel injures those deeply seated sensory-motor arcs which produce a modified form of decerebrate rigidity and which according to Scheinker[7] are dependent on the integrity of centripetal pathways or their end stations in the thalamus.

CONCLUSIONS

Co-existing disturbances in skin sensation occur in approximately 76% of all hemiplegias, and in most instances such changes consist of a blunting of all qualities of sensation. The flaccid forms of hemiplegia demonstrate sensory disturbances over the paralyzed areas at least twice as frequently as those which are of the spastic type.

The most pronounced hypotonia in hemiplegia is found in those patients in whom there is also detected a homonymous hemianopia of the same side. The triad of hemiplegia, hemianesthesia and hemianopia is attributed to a lesion of the anterior choroidal artery, which also interrupts the tone-regulating sensory-motor arcs of the basal ganglia thereby producing a flaccid state in the paralyzed arm and leg.

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Half the Battle . . .

Remarks on Mental Hygiene at the Battlefront

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Psychiatric casualties in modern warfare are a medical problem that is appreciated no less by the line officer than the medical officer. Casualty statistics demonstrate in no uncertain terms that it is a problem of increasing concern. As surely as an army "travels on its stomach" it fights and wins victories in a very real sense on its spirit. That spirit—the "morale," the "espirit de corps"—assumes greatest importance at the battlefront where stress is severest and the stakes are highest; when it falls psychiatric casualties increase, and when individuals begin to break down mentally morale falls, for mental disease can be as contagious as measles.

Basically a man "cracks up" for one of two reasons: either the stress is too great or his individual mental stability is too low. Military necessity largely determines the first factor and the man's inherent mental makeup, his background, training and attitudes, the latter. Let it be remembered that any individual will break down if the stress—internal or external—becomes sufficiently great. Much is accomplished by chaplains, personnel, supply, line and medical officers to decrease the mental hazards of war and render the individual more fit physically and mentally. A better understanding of the early signs of mental breakdown and of the forces in the individual and in his environment which produce it, will render the officers more capable leaders.

A prominent characteristic of genuine war neuroses is that precipitating factors are generally more important than predisposing factors in the etiology . . . the man's present is of more significance than his past in the actual production of the neurosis, though his past may shape the neurosis. The onset is usually more sudden. Because the illness does not run so deep into the personality the psychopathology is not as complicated and is more amenable to treatment—especially early treatment—than is the case with the neuroses seen in peacetime. Such precipitating factors as suppressed fear, demoralizing inactivity, and loss of confidence in leadership, first lower the group spirit then take their toll of manpower. They are reflected in the long line of patients at sick call complaining of indigestion, insomnia, strange new aches and pains, loss of appetite, dizziness, nightmares, and just plain "nervousness." Many of these men who are treated symptomatically and are able to go on will succumb later under the intense activity, terror and physical hardships of actual battle.

Fear has been called the keystone of neuroses. To a certain extent it is chronic in wartime and certainly it is acute at the battlefront. A degree of fear, of insecurity, of injury, of pain and of violent death must accompany every normal man when his business is to kill or be killed. But because the popular concept of a good soldier is a fearless one such emotions are usually suppressed, dammed back where, if too much of it accumulates, it may break through in a torrent of hysteria or, as more commonly happens, release itself through chronic physical symptoms or some of the milder but devitalizing anxiety states. In the individual the mental conflict lies squarely between two deep-rooted motivating forces: his primal instinct of self-preservation vs. his entire social consciousness of honor, a sense of duty, love of home, of country, of principles, and the demanding requirements of self respect. Like an iceberg, only a fraction of this conflict may protrude above the surface of his subconscious so that he may be almost entirely unaware of the true nature of his disturbance. Even a keen realization of the forces at work may leave the victim utterly helpless to help himself.

The able leader can do much to dissipate fear and even more to minimize the ravages

of fear among his men, for certain principles of mental hygiene and psychiatry will work as effectively at the battlefront as in any other field of human affairs. He can help bring fear out into the open, externalize it, strip fear of its personal stigma. To a degree he can make fear respectable knowing that it arises from the same well-spring of emotion as does love of country and impelling zeal to fight the enemy. As Lincoln observed: ". . . A man who has no vices has damn few virtues." Thus a man must have a complement of fear as part of a normal emotional drive. The officer owes it to his men to, insofar as military expediency permits, eradicate that most paralyzing of all fears, fear of the unknown. Too often the explanation of operational plans, of the enemy's "secret weapons," or past enemy actions is left to the unbridled amplification of "scuttlebutt" when the facts could be told without violating military security.

Much of the time at the front must necessarily be spent in waiting—waiting for orders, for equipment, for the advantageous time to strike. One who has been through a period of enforced inaction, possibly under bombardment, knows well that ". . . he also serves who only stands and waits." For it is during these periods that enthusiasm wanes, "scuttlebutt" flourishes, and men may tend to lose sight of the reason for their hardships. They feel forgotten. Progress seems to be at a standstill. Air raids must be endured and, unable to fight back for the time being, there is a sense of frustration and a mounting anxiety unless measures are taken to avert it. At these times, more than ever, recreational programs and drills are needed; group contests in athletics not only absorb interest but also stimulate team spirit that makes for cooperation, and the mechanism of gun drills and other preparations for battle providing an outlet for a man's aggressive forces is more than conjecture. Gunners who do the shooting at bombing planes and officers who do the planning and preparation for battle show least the anxiety of waiting.

In the final analysis the spirit of any given group of men is most critically dependent upon their leadership. Confidence in leadership alone frequently has been able to compensate for physical and mental needs and turn failure into success in the face of what seemed insurmountable obstacles. To a certain degree the inherent dependence a man learned to place in his parents is displaced onto the officer who leads him. How much of that dependence is transformed into confidence is a function of the respect—personal and professional—in which that officer is held. And nothing is more devastating to confidence and morale than unfulfilled promises, unnecessary hardships, indifference, and incompetence. As confidence in leadership falls, the individual's sense of security falls, a prime factor in the production of war neuroses.

Strecker defines three layers of morale: the physical factors (which have, nevertheless, great psychological import) including basic comforts, good food, attractive uniforms, living quarters that are neat and clean, and certainly adequate sleep; second, a psychological self-understanding that enables the individual to know and deal with fear and his instincts of self-preservation; and third, the ideological concepts such as why we fight (few, it seems, can fight with vigor only for the sheer excellence of fighting), confidence in leadership, concepts of future rewards. These, of course have many ramifications in the immediate things such as pay, mail with its news from home, liberty, rewards for merit, etc., that mean so much to the man at the battlefront. And a knowledge of first aid may be of inestimable value to the individual whether he ever has occasion to use it or not simply by the added sense of security which it imparts.

Certain qualities a man brings with him to the battlefront can be nourished and often developed to great advantage: a sense of humor to override many a rough spot (it seems to flourish well in some groups of men), at least a beginning of a personal philosophy of life without which the experiences of war would have little meaning, and faith in something . . . in self, in our cause, in God. The officer whose job it is to censor men's mail is constantly reminded of the role these intangibles play in individual and hence in group morale.

Finally, the weeding out of psychiatric casualties—and incipient psychiatric casualties—must be done promptly if the contagion is not to spread. It cannot be accomplished entirely by the medical officer for many growing neuroses do not show themselves in terms of physical symptoms until late, and sometimes not at all. Instead, they are manifested as behavior problems, irritability, abnormal emotional reactions, indecision, lowered efficiency, negligence in duty, nightmares, startle reactions, seclusiveness and personality changes—all danger signals that call for more than a superficial consideration, and so frequently herald more profound mental disorder. The perceiving chaplain, line or medical officer who recognizes these prodromal signs and symptoms has the strategic opportunity of averting mental breakdown by providing even the simplest measures of treatment at a time when these cases are most amenable to treatment. Here again, closer cooperation between the line and staff officers dealing with personnel will result in fewer psychiatric casualties, a higher morale, and thus will serve military ends.

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The Emotions and the Cerebrum

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There is no general agreement as to the region of the brain in which the emotions have their origin. Bard, who did extensive experimental work on the emotions, expressed doubt concerning the existence of nerve pathways and stimuli having their source in the cortical area of the brain, because no case of "emotional paralysis originating in a cortical lesion has yet been recorded." However, some instances have been encountered which indicate that the cortex of the brain contains centers for the integrating mechanism of emotional expression. Mills believed that the right midfrontal region of the brain is a center concerned with the expression of the emotions. Papez found even more definite areas. He stated that the gyrus cinguli and hippocampus and their interconnections with the hypothalamus and anterior thalamic nuclei constitute a harmonious mechanism which may elaborate the functions of central emotion as well as participate in emotional expression.

Davidson and Kelman at the Neuropathological Laboratory of Montefiore Hospital carried on an extensive study of a large number of cases which gave them a good idea as to what part of the brain has to do with the emotions. From their series of cases of diseases of the cortical area of the brain, they were impressed with the fact that fibers for emotional expression may originate from the greater part of the cortex, especially the frontal, premotor and sensory cortex. They made a thorough study in a series of cases of various forms of brain damage. These damaged areas were correlated with emotional responses. Thus pathological laughing and crying may also occur with lesions of the frontal convolutions or corpus callosum. The former structure probably has contingents for the control of this mechanism. Euphoria, silliness, and irritability may be associated with outbursts of either laughing or crying.

Laughing and crying are two very highly colored emotions and both originate in the brain. Wilson suggested that both the facial and the respiratory mechanism participate in the act of laughing and crying. He

believed that this faciorespiratory mechanism was controlled by certain brain areas, namely the cortipontile, corticobulbar and corticospinal tracts. Bard, however, on the basis of experimental work, expressed a contrary belief. He concluded that strong emotions are subcortical in origin and that the central mechanism lies in an area comprising the rear half of the hypothalamus. He expressed the opinion that the complete expression of an emotion depends on an intact hypothalamus. Ingraham, by making incisions in the brains of cats, anterior to the optic chiasm, extending from the midline of the olfactory radiation, concluded that the rage responses in several animals were probably produced by the division of the corticohypothalamic pathway, thus releasing the hypothalamus.

Goltz, Dusser de Barenne, Rothmann, Schaltenbrand, and Cobb showed that cortical ablation renders an animal excessively prone to the display of anger and other emotions. It is thought that decortication in these instances acted as a "release" of the subcortical rage mechanism from the cortical inhibitory influence.

Foerster, Gagel, and others obtained manic-like reactions in human beings by irritation of the hypothalamus in the presence of an intact cerebral cortex. Alpers produced evidence that emotional disturbances may result from diseases of the hypothalamic nuclei. In his, as in Foerster's cases, the cerebral cortex was intact. This suggests that the hypothalamus also has an inhibitory influence on the cortex. Although the evidence brought forth shows that the hypothalamus, is possibly one of the main centers for the control of the emotions, there are undoubtedly other centers which have to do with this mechanism. Disease of the thalamus and basal ganglia demonstrate that these structures must be intimately connected with the hypothalamus and other centers for emotional responses. Interruption of these pathways on their way to the hypothalamus or of the descending pathways from the hypothalamus may lead to the production of the same mechanism.

Woodworth, Sherrington, Bazett, and Penfield obtained emotional reactions in cats that had been decereberated. Mostly these were of rage and anger, such as spitting and growling. Diseases of the mesencephalon also give emotional disturbances.

From the vast amount of clinical and experimental work done on the emotions it is now known that certain areas, namely, the frontal, premotor, motor and sensory, may act as centers in the integrating mechanism for emotional expression and feeling. These impulses are mediated by voluntary and involuntary pathways. Voluntary action for the inhibition of the automatic movements is controlled by the pyramidal tract, and involuntary action by the corticohypothalamic pathways.

Involvement of part of the cortex of the brain undoubtedly removes its inhibitory control over the hypothalamus and other diencephalic nuclei, which are the main centers or stations for the release of the emotions.

In a series of experiments, sham rage occurred regularly after ablation of the corpora striata and the rostral half of the diencephalon. It appeared in tyical form after still more truncations of the brain stem. Sham rage occurred when there remained only a thin segment of the diencephalon above the midbrain. Head and Holmes and others demonstrated that the thalamus is under cortical inhibitory influence and is possibly a center for emotional experiences. They claimed that an injury of the corticothalamic fibers releases cortical control, thereby inducing excessive emotional reactions.

Out of this maze of facts the modern brain anatomist has gained some inkling into the relation of brain structure to emotions. The main center of the emotions is the hypothalamus, which sends and receives fibers to and from various parts of the cortex of the brain by means of the hypothalamicortical and corticohypothalamic pathways. In turn, the hypothalamus is also in intimate connection with the thalamus, striatum, pallidum, midbrain, pons and facial and ambiguous nuclei. Cases of extrapyramidal disease illustrate the role of the striatum and pallidum in the release of emotional responses. This undoubtedly is produced by the direct

interference in the pathways connecting the extrapyramidal structures with the hypothalamus or by means of the thalamic connection. Some of the experimental and clinicopathologic reports of thalamic lesions indicate the importance of the diencephalon in this mechanism.

The function of the midbrain and pons was illustrated by Magoun and his co-workers in the production of emotional responses when these structures were stimulated electrically. Another possible important pathway is the slowing and arresting pathway postulated by Spencer, which arises somewhere in the temporoparietal lobe just outside the olfactory tract, enters the olfactory limb of the anterior limb of the anterior commissure, where it decussates, and continues beside the infundibulum, external to the aqueduct, and into the medulla oblongata, where it may send or receive fibers from the facial and ambiguous nuclei. This pathway is possibly also in intimate connection with the hypothalamus. Lastly, the voluntary pathway for emotional responses is situated essentially in the pyramidal tract, which is also in intimate relation with the facial and ambiguus nuclei.

Dana and later Cannon suggested that emotion is dependent on the functions of the cerebral cortex and diencephalon. The cerebral cortex is the site of emotional consciousness. According to Cannon the diencephalon discharges impulses upward to the cortex by means of the hypothalamicortical pathways, thus evoking emotional consciousness. The efferent impulses discharging from the diencephalon downward produce the emotional response after having reached the cortex and being affected by it. When the impulses reach the cortex there is a change from the "object simply apprehended" to the "object emotionally felt." Cannon expressed the belief that the "peculiar quality of the emotion is added to simple sensation when thalamic processes are aroused."

Emotional feeling in some cases of aphasia can exist without emotional expression because of the destruction of the efferent pathways. According to Cannon's theory, feeling must be central in origin, and it is transmitted by afferent impulses from an intact thalamus. In cases of extensive diseases of the diencephalon, the expression and the feeling disappear together. This would seem to indicate that the diencephalon is not entirely accountable for these emotions but is only part of an integrating system.

However, the theories of Cannon and Bard do not explain all phenomena found in association with the emotions. It accounts only for the emotional responses as a result of diseases in the diencephalon or below it. This theory does not explain those emotional expressions which are purely cortical in origin. There are many cases of diseases of the frontal area of the cortex, which lead to emotional upsets. Also, diseases of the midbrain and brain stem may lead to emotional disturbances.

SUMMARY

There is no doubt that the emotions have their origin in the brain. There is no one particular part of the brain in which the emotions can be said to arise exclusively. It is true, for instance, that the faciorespiratory mechanism and its pathways to the cortex and subcortical regions of the brain are in the main responsible for the genesis of the emotions. Yet, in the final analysis it must be said that no single structure of the brain is important. All must be integrated for the control of feeling and expression.

183 Avenue "O."

Rehabilitation of the Returning Psychoneurotic Service Man

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Every psychiatrist and every physician is interested in the problem of the returning service man with neurotic disability. This interest I sincerely hope will be sustained until long after the return of the last of our veterans.

In speaking with many persons about this problem one readily realizes that the attitude varies from complacency to panic, with the panic reaction being by far the most frequent. I have heard many physicians state with feeling that they feared the day when a great number of soldiers return with profound neuroses, to be a burden and a menace to their communities. Since this is the attitude of many people, it is worthy of our principal attention. In my opinion, we need not concern ourselves about "this terrific problem"; I do not believe the numbers will be great or that they will tax the resources of the community or constitute a serious problem.

Many of us are losing sight of the fact that psychoneurotics have always been with us, that they have created some problems but have not disorganized our society, and I do not believe that the increased number will overwhelm our resources or become a great problem. When we grow upset as we contemplate this problem of the neurotic veteran it reminds me of the old man with the long beard who, when asked by his grandson what he did with his beard as he slept, could not tell whether he kept it under or outside the covers. That night as he tried to sleep, first with the beard inside and then outside the covers, he could not be comfortable with it in any position and had to shave it off. I feel we are somewhat like this and should realize we have always had neurotics in our communities and that the increase incident to the war will not overwhelm us.

I am rather optimistic about the returning service man with neurotic disability because I believe he will be better understood than the neurotic has been at any time heretofore. This better understanding will be assured as physicians, through their medical societies and periodicals, are given opportunities of acquiring more knowledge of psychopathology and psychotherapy so they will be more skilled in treating emotionally produced physical and mental deviations.

For a long time the attitude toward the neurotic has been one which regarded him as a blight, one who was wilfully sick and was made of poor stuff. At last this attitude is changing and I believe when every person accepts the fact that we have all passed through several episodes of neurotic behavior and disability, we will no longer regard the diagnosis of a neurosis as stigmatizing. A neurosis exists when an abnormal response becomes the usual response to the problems of life and the individual is no longer capable of adjusting adequately to the realities of his or her existence. Neurotic behavior may occur in anyone when the strain is sufficient; each of us has our breaking point. The man who "broke" when his fortune was lost in the stock market crash of '29 presented the same symptoms the soldier will present on his return from war, upset by the fact that many of his buddies were lost within his sight and hearing. Our first attitude must be that the returning service man will not present any new symptoms or any unique behavior pattern.

Another misconception which must be corrected is that neuroses are incurable. Under difficult circumstances every one has experienced distressing sensations and disturbance of body function. If the difficult circumstances persist for some time the symptoms may continue even after the situation has ended. The serviceman, separated from home and family, in training or in combat, may experience distressing sensations and disturbances, which may continue after his discharge. He may become anxious about these symptoms and manifest an established neurosis. Like civilians

the returning war veterans are going to recover from their neuroses and a large percentage of them will recover without psychiatric or medical assistance. The return to favorable living circumstances alone will lead many to recovery.

The fact that a great number will recover without assistance does not lead me to suggest that nothing be done about the problem, for much can be done to alleviate their suffering. As physicians, we should become better equipped to handle the civilian neurotic in our own practice and I would like to point out that more young men were rejected at the induction center for psychoneurotic disabilities than for any other single cause. By the end of the war these rejectees will probably outnumber those who will be discharged from the service for the same type of disability. Those men disqualified for military service have as much claim upon us for improvement and understanding of their condition as the returning veteran. As the physician becomes more expert in handling the civilian neurotic he will be better able to aid the veteran.

Many men were returned daily from training centers because of psychoneuroses which made them unsuited for military service. In order to lessen the period of suffering of these men, whether they were rejected at the induction center, weeded out at the training station or released after prolonged combat experience, much can be done and must be done by all concerned. The services themselves I believe can do a great deal by preparing the men for their return to civilian life. The returning veteran must have called to his attention the fact that he has undergone change during the period of military service and that those at home have also changed. Upon their return these veterans must be prepared for such changes and made to realize that in a short time—as they join in the experiences of their family and friends—they will again grow together and live in harmony and understanding. They will, however, have had experiences which only those who have had similar ones can understand. These veterans will get together at the Legion, the Veterans of Foreign Wars, the club, or at the corner hangout and from each other will gain security. They will find understanding from their buddies and the buddies will quickly recognize those who may need psychiatric help and should learn to direct them to such assistance.

The service put our brothers, our sons and our friends through effective indoctrination courses to prepare them for combat. They should make an equally effective effort to prepare them for their return to civilian life. At this time the services do not have sufficient psychiatric and medical personnel to initiate such a comprehensive program of preparation for separation from the service, but this situation I believe is being remedied.

On the home front we physicians must help families to understand the changes that will occur in the men returning from the service. We must prepare these families for the changes that are bound to take place. Often the changes will be great. They must be made to realize that time will be required for veterans to readjust. However, we must not permit families or a community to regard them as a problem or they will be a problem.

The men who return with neuropsychiatric disabilities, I believe, can be divided into several groups. *First,* that group which is frightened and hurt, has lost courage and confidence in their ability to resume their places in society. These men will require encouragement and time to readjust. If the family, especially the young wife, will learn to appreciate that the husband who left a swashbuckling, confident individual is like a scared and hurt child, he can be given the type of treatment our mothers gave us when we experienced some unpleasant ordeal in our childhood. The wife who is capable of being a mother at this time will go a long way in restoring her husband. The unmarried men as well as the married in this group crave encouragement, affection and support. If this is not provided by their families and intimate friends many of them will rush into hasty marriages because of their need and desire for love.

A second group that will require assistance are those who are depressed, who frequently become preoccupied with thoughts of combat and lost buddies and seem de-

tached from their surroundings. These individuals require expert psychiatric treatment. They do not benefit by the well-meant show of good fellowship and invitation to the bar. Many will become alcoholics if they are permitted and encouraged to drown their sorrows. Many times they have feelings of guilt. Every soldier who fails in combat or in service because of a neurosis may experience guilty feelings. Psychiatric service should be provided for the men in this group. Pleasant associates and employment will also be very beneficial.

A third type to be considered is the hostile, aggressive veteran who comes back damning his incompetent superiors, the supply corps, the medical corps and everyone associated with the armed service. Such an individual presses his claims for compensation with vigor. As a rule his hostility is born of his own feelings of insecurity, incompetence and guilt, and is blindly directed against those who commanded him during his term of military service. Unfortunately, many of this group—because they have been badly handled by physicians in the service—will activate their hostility toward these medical men, the veterans' bureau and all who do not agree with them that they have been ruined by the service. Many in this group will require psychiatric assistance; others will be trouble-makers and may reject proper management. Inquiry will reveal that most of them behaved similarly before induction. Despite the unfavorable outlook a majority of men suffering neurotic disability will return to normal without assistance. Many will present combinations of these traits and most of them will experience numerous visceral complaints. These visceral components may be the cause of intense anxiety and cause the veteran to fear serious consequences. Telling him bluntly there is nothing wrong with the offending organs and that he has to snap out of it will be of no benefit. He must be helped to understand that strong emotions such as fear (stage fright) may disturb body function. He must be assured that fear and worry are to be expected as a result of his experiences and that as he becomes calm and readjusted these symptoms will subside. Not all of these men will require expert psychiatric care but if progress is not made in a few months they should be directed to a psychiatrist.

Every community owes it to the veteran to provide measures to increase his comfort and aid him in his readjustment. He should receive a hearty welcome upon his return, a welcome which indicates his past efforts are appreciated and that his future service to his community is anticipated. Assurance that community medical and other resources are available will be helpful and indications that return to productive work are taken for granted will help in restoring his confidence. Assistance, when needed, should be given but ended as soon as the need is no longer urgent. Our aim must be readjustment of their lives not adjustment of their compensation checks. Restoration of their self respect will be their greatest compensation. Much is being done by those agencies interested in the re-employment of the veteran and nothing will have the same restorative effect as satisfactory employment. Community agencies for placement of veterans should be active and intelligently administered.

It is inevitable that there will be many mistakes and injustices in the re-educational program under the G.I. Bill of Rights. We must try to help the veteran, his family and interested agencies understand that few neurotic veterans are capable of benefiting by a re-educational program without psychiatric assistance to effect an emotional readjustment.

I have indicated that many alarmists anticipate a crime wave, a period of delinquency and debauchery such as man has never known, when these veterans return. I think we can be reassured if—and this "if" is very important—the veteran returns to a community which is living reasonably close to the ideals for which he fought and if his community so treats him that he believes his sacrifices and the sacrifices of his buddies were not in vain. This may involve radical reformations; it will require of public servants an integrity and honesty which have not been usual in the American politician. It will require judges on our benches,

men in legislative bodies, office holders and public servants generally whom these veterans can respect and have confidence in. We on the home front should prepare our community for the returning service man by the selection of men of integrity and vision for public office. We can do them no greater service. After the last war we had prohibition with all its attendant hypocrisy —on the bench, among the police and even in the doctor's office. The returning soldier soon had no more respect for Judge So-and-so than he would have for Quisling or Laval. His reaction was, "So this is what I fought for."

Let us give the returning veteran a "break" by doing away with political machines which are traitorous to real democracy. To come back to a country which has adopted compulsory military training may be rather bewildering to the veteran who believes he is fighting for the establishment of international good will and understanding. It will be difficult for him to appreciate why the establishment of international good will and understanding will require a larger standing army than we ever had before. He is not likely to have the mistrust of our allies which so many "stay at homes" manifest. Let us not bewilder him by our neurotic national behavior.

As has always been the case, war has brought benefit as well as destruction and it is my belief that the greatest good that will result from this war will be the reawakening of man's interest in man; man's interest in his own and in his brother's behavior. Psychiatry's advance should be utilized to promote better understanding of man's individual and collective behavior. New frontiers in mental medicine will be explored and coming generations will appreciate more fully the role which emotion plays in catastrophic blunders in their own lives and in the behavior of nations. Man's greatest benefit from the war will be the advances in individual and social psychiatry.

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Neurological Clinical Pathological Conference

of the

Cincinnati General Hospital

CHARLES D. ARING, M.D., Editor

CASE NO. 194589

Presentation

An unmarried white male office worker, aged 27 years, was brought to the hospital by the Life Saving Squad, paralyzed in all four extremities, with anesthesia of his trunk and extremities and in acute respiratory distress. History was obtained from the mother and friends.

The patient was a cripple, which was first observed when he learned to walk. He walked with legs flexed, feet turned inward, body tending to pitch forward. There was no family history of similar difficulty.

About five weeks before admission, the patient fell down four or five steps, scraping his right elbow and knee, but remaining uninjured otherwise. Two to three weeks before entry he had a gastro-enteric upset lasting a few hours characterized by nausea and vomiting (two to three times). Eight days before admission he experienced pain in his left shoulder while getting into bed; there was some thought that he had sprained it. He continued to have moderate pain in that shoulder thereafter.

The night before admission the patient was quieter than usual. There was no complaint and he had worked on that day. At 1:00 A.M. his roommate spoke to him and he seemed well. At 6:45 A.M., 1½ hours before admission to the Receiving Ward, he complained of pain in his left shoulder and of numbness and paralysis of his left upper extremity. This was followed quickly by rapidly progressive (within 20 to 30 minutes) paralysis and anesthesia of the left lower extremity, then the right lower extremity, and finally the right upper extremity. Within an hour his speech became jerky and he began to have respiratory dif-

ficulty. A bluish red discoloration appeared around his upper chest and anterior neck. He did not have headache, vomiting, or convulsion. The Life Saving Squad found the patient cyanotic and unable to talk, though able to move his lips.

The past history revealed that the patient had had occasional headaches since childhood. These had become more frequent during the last 18 months. They were generalized and relieved by aspirin. He once had a three to four day episode of jaundice. In addition he had infrequent bouts of "not too severe" diffuse abdominal pain.

In the admission examination the temperature was 97.2° F., the pulse rate 80, and the blood pressure 160/90. The patient was a well-developed, but thin, acutely ill young male, receiving artificial respiration by pulmotor, which could be removed without causing extreme distress. He was conscious and could move his lips but was not able to make a sound.

He was perspiring profusely, and there was slight cyanosis of face and nail beds. There was some weakness of left face of central type and some loss of light touch, pinprick, heat and cold in the left side of the face. No snout reflex could be obtained.

Conjunctivæ and scleræ were markedly injected. The right pupil was 3.5 mm., the left 3 mm. in diameter; they reacted promptly and through a good range to flashlight. The fundi were difficult to visualize because of wandering eyes and small pupils; the right disc appeared normal; the left was not seen. The left corneal reflex was diminished. Movements of the eyes were normal.

He was unable to protrude the tongue beyond the teeth. The gag reflex was absent. There was no nuchal rigidity and no tenderness over the cervical spines. Respiratory movements were entirely abdominal, being short, labored, and regular. The chest was clear. The heart was not enlarged; there was a short systolic murmur at the apex.

Complete paralysis of all four extremities was found; in the uppers it was flaccid, the lowers had a little more tone. There were high arches bilaterally. Deep reflexes and abdominal reflexes were all absent. No Hoffmann reflex was obtained. The plantar responses were extensor bilaterally. There was no Chvostek or grasp reflex. Sensation was completely absent below the lower border of the mandibles.

Laboratory Data: Lumbar puncture revealed a grossly bloody fluid, which spurted out. The initial pressure was 650 mm. of water. No change in pressure occurred on jugular or abdominal compression. After removal of about 20 cc. of fluid, the final pressure was 150 mm. After centrifuging, the supernatant fluid was slightly xanthochromic. The total protein content was 1100 mg. per cent, the chloride 714 mg. per cent; the culture was negative. A Wassermann test was not done; the colloidal gold curve was 5555533332. Cisternal fluid (bloody) protein was 550 mg. per cent (cisternal tap done just after death).

Course: Except for short periods early in his course, the patient was given artificial respiration continuously. The Drinker respirator was tried but he did not do well in it.

On reaching the ward, 3½ hours after admission to the receiving ward, he was unconscious. Coarse rhonchi were heard in the chest and bloody sputum was present in the mouth. Temperature was 104° F., pulse 120, respirations 36, and blood pressure 120/65. After intermittent application of ice bags and fans for four hours, the temperature fell to 99.6, but rose again in a short time to 102.8. On the ward the eyes were noted to be deviating to the left. Later an occasional clonic twitch of the right arm was noted. He regained consciousness for short periods twice while on the ward, during which times he could nod his head in response to questioning. His respirations gradually became irregular and weaker, cyanosis increased, bloody mucous collected in the throat, pulse became weak, and irregular, and heart ceased to beat after 17 hours in the hospital.

Differential Diagnosis

Dr. Milton Rosenbaum: We know that this patient suffered from an acute catastrophic vascular lesion in his nervous system. The main differentiation as far as localization is concerned, is whether the lesion is high in the cervical cord or in the medulla or in both.

It is difficult to know what caused the boy to be a cripple. Since he had what we call neurological feet, I would assume that it was due to some type of congenital neurological abnormality. The gait might fit the spastic type, and inasmuch as it was present since birth, it may have been a form of Little's disease. The patient suffered a lesion in the spinal cord which caused his death, and I wonder if it was related to the reason for the abnormal gait.

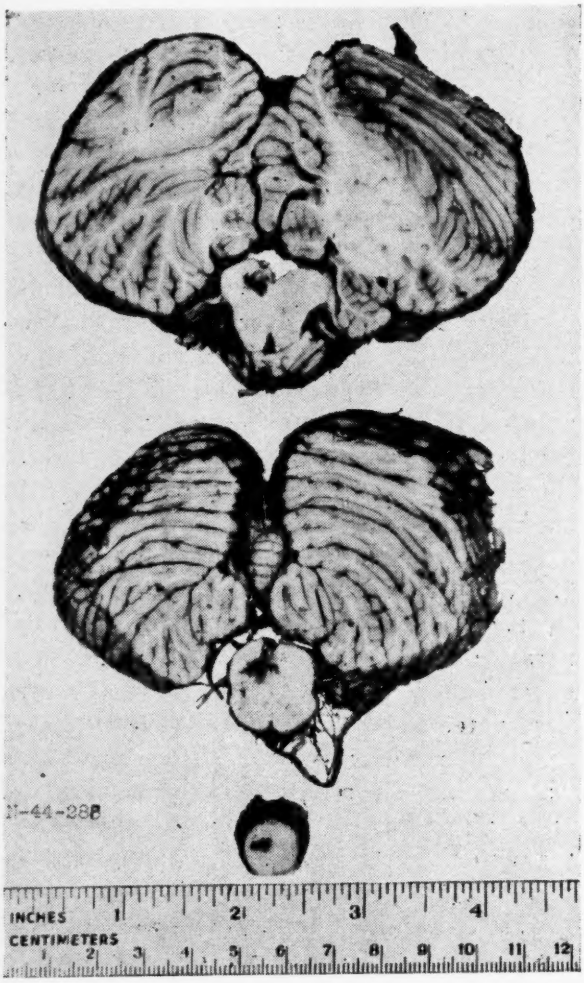

Figure 1. A photograph of sections of the medulla, cerebellum, and cervical spinal cord to show the distribution of the hemorrhage, dorsally and on the left.

There is a history of mild injury which doesn't help much, and I think I will disregard the gastro-enteric upset. He had had pain in his left shoulder for eight days before admission; possibly the first symptom of the lesion which eventually resulted in complete paralysis. That gives a clue to the localization of the lesion, which possibly compressed cervical roots 3, 4, or 5.

There are several indications of left-sided disturbance, pain in the left shoulder, numbness and paralysis of the left upper, then left lower extremities. Other signs point to the high cervical cord on the left; there was some impairment of sensation on the left side of the face and the left pupil was slightly smaller than the right. He also had slight weakness of the left lower face. For what it is worth, lower facial palsy has been observed in high cervical lesion.

The quadriplegia had developed within 20 to 30 minutes. One would expect an acute transverse lesion of the cord to start with paraplegia. Within an hour there was speech and respiratory difficulty, probably a clue to the march of the lesion. If the main locus had been in the medulla the possibilities are that he would have died very quickly, and that it required an hour or so for medullary signs to develop probably indicates that the disorder spread rostrally to the hind brain. The indications are that the original locus of the lesion was below the brain stem.

The patient was unable to talk but was able to move his lips, an unusual symptom. Certainly the inability to talk was not due to dysphasia. One would have to say that this represents a bulbar sign and that it was due to bilateral involvement of the vagal nuclei. Yet one wouldn't expect a man to live very long with such involvement. Certainly there wasn't complete paralysis of the vagi, rather there was partial involvement.

Now as to the nature of the lesion; the acute onset and the bloody cerebrospinal fluid point to a vascular lesion associated with hemorrhage. The lesion might have been subdural, rupturing into the subarachnoid space, or within the cord rupturing into the subarachnoid space. The fact that the patient had had root pain in the left shoulder for eight days would tend to make me think that the lesion was extramedullary.

What are the spinal lesions that may result in bleeding? We surely must consider that this boy had some type of congenital neurological difficulty. A vascular tumor, that is, hemangioma, may be found in the

cerebellum, brain stem, or spinal cord. Hemangioma of the nervous system is sometimes associated with hemangiomas of other organs of the body and the disorder may be congenital in type.

Trauma may provoke either bleeding into the cord, or bleeding from a vascular tumor.

Aneurysm of the spinal cord is extremely rare. Aneurysm of the vertebral artery may occur; the symptoms are primarily medullary and death may quickly supervene. There are all sorts of vascular anomalies of the cord but they are not very common.

Is this hematomyelia, that is, did bleeding occur within the cord substance spontaneously? In most of the cases of hematomyelia which have been reported, the cerebrospinal fluid is not as bloody or under the pressure that it was in this case.

The cerebrospinal fluid findings are extremely interesting. The pressure was terrifically high, 650 mm. of water. The protocol states that the cerebrospinal fluid spurted out. Is there evidence for a subarachnoid block? There was no response to jugular or abdominal compression; with an initial pressure of 650 mm., we would not expect venous compression to raise the cerebrospinal fluid pressure, because the limits of cerebral venous distention have already been reached. The marked respiratory embarrassment may have been a factor in the high cerebrospinal fluid pressure. It would have been nice to know what jugular and abdominal compression would have done after the pressure had been reduced to 150 mm.

The protein in the cisternal fluid just after death was 550 mg. per cent which was about one-half the value of that in the lumbar fluid. If the lesion were primarily in the medulla one would expect in cistern drainage, to be right in the locus of the blood. The cisternal protein value of half that of the cerebrospinal fluid in the lumbar sac, may mean that the bleeding was below the cistern.

I think this man had a vascular lesion, probably a vascular tumor of the upper cervical cord, which ruptured through the cord tissue into the subarachnoid space. Edema of, and pressure on the hind brain resulted. Some blood seeped rostrally into the parenchyma of the hind brain. As for the original cause of the crippling, one might find a lesion in the brain which may be associated with the diagnosis of Little's disease.

Clinical Diagnosis

Aneurysm of the basilar artery with rupture into the medulla.

Doctor Rosenbaum's Diagnosis

Hemangioma of the cervical spinal cord with rupture.

Little's disease.

Anatomical Diagnosis (Brain Only)

Hematomyelia and hematobulbia.

Vasoparalysis, widespread in brain.

Hypertensive cord (cervical) disease.

Discussion of Pathology

Dr. I. Mark Scheinker: Postmortem examination was done 12 hours after death and was limited to the brain, which grossly showed diffuse subarachnoid hemorrhage. Multiple coronal sections through the cerebrum after fixation disclosed a few scattered areas of petechial hemorrhage in the subcortical white matter, basal ganglia, and cerebellum. A larger hemorrhage was found in the brain stem (Figure 1). This hemorrhage was on the left side of the medulla in the dorsal portion; it extended downward in much the same position into the upper cervical cord. The caudal extent could not be determined since permission for autopsy unfortunately was limited to the brain. There was no blood in the ventricles.

The microscopic examination revealed intramedullary hemorrhage extending throughout the regions noted above. It destroyed the left vagus and hypoglossal nuclei. In the vicinity of the hemorrhagic lesion some of the small veins and capillaries revealed advanced necrosis of their walls and were surrounded by large accumulations of red blood cells. Similar vascular alterations could be seen in the white matter of the hemispheres, and in the brain stem and cerebellum. A point of gross escape of the blood into the ventricles or subarachnoid space was not found.

Sections taken from the upper cervical segments of the spinal cord disclosed an intramedullary hemorrhage confined to the

posterior horn of the gray matter, and there was marked edema and swelling of the white matter. There was marked hyalinization of the arterioles in the few segments of spinal cord that were available for study.

The axones of the cranial nerve roots, as well as the roots of the upper cervical segments of the spinal cord, were swollen.

We are dealing with hematomyelia and intramedullary hemorrhage, and an associated widespread vasoparalysis of the small cerebral blood vessels. I should now like to discuss the etiology of these lesions.

An intramedullary aneurysm is an extremely rare occurrence, and can be ruled out without hesitation in the present case. No explanation is forthcoming for the spontaneous hematomyelia and intramedullary hemorrhage.

A closer examination of areas of the central nervous system far removed from the hemorrhagic lesion disclosed vascular alterations which, according to our neuropathological observations, are seen in almost all cases of central nervous system injury. We consider them as characteristic for trauma although by no means pathognomonic. The presence of this vascular syndrome, the diffusely disseminated areas of small petechial hemorrhages in areas far removed from the main lesion, makes one wonder whether this was a case of post-traumatic petechial and massive hemorrhage.

An interval of four weeks elapsed between trauma and the beginning of the clinical symptoms; the latter may represent the so-called late apoplexy, a condition repeatedly observed but not yet satisfactorily explained.

Doctor Rosenbaum: It is sometimes courageous to take a stand on an unknown issue, but in this instance I think Doctor Scheinker has gone beyond the limits of reality. In this case there was not an adequate history of trauma. When one doesn't know the answer we might as well admit it.

The explanation of the congenital disorder that caused this boy to be crippled is not forthcoming. It may or may not have a connection with the cause of death, but it might be taken to indicate that congenital vascular anomalies were operating.

Doctor Scheinker: There was very mild focal gliosis of some of the cortical regions that might have been associated with the difficulty in walking.

What is the evidence for a possible traumatic etiology? The hemorrhages were not limited to one area; there was massive hemorrhage in the medulla and cervical spinal cord. In addition, there were numerous minute focal hemorrhagic lesions in the white substance of the hemispheres and cerebellum. Multiple petechial and massive hemorrhages are common findings in brain injury; from a statistical point of view trauma is probably the most frequent cause of such lesions.

A moot point in this case is the interval between the first clinical symptoms and the trauma, such as it was (five weeks before hospital entry he fell and slightly injured the elbow and knee). What is considered to be a mild injury might produce diffuse vascular lesions in the central nervous system.

The interval between trauma and clinical manifestation theoretically may be long, if the cerebral lesion of injury be not static. The earliest change may be edema, which is usually associated with disturbed vasomotricity. If the stasis persists, degeneration of the vessel wall may take place.

The earliest clinical symptom in this case was radicular pain, possibly explicable by compression of the roots by an edematous spinal cord. The hemorrhage may have occurred after a long interval, possibly because the functional vascular disorder persisted and resulted in structural change in the small veins and capillaries.

Doctor Eugene B. Ferris: Could cerebral anoxia due to the high intracranial pressure or to the increasing respiratory embarrassment or both cause the diffuse changes that you find in the brain? As I understand it this vasoparalysis is a non-specific lesion which is seen not only in trauma but in various other encephalopathies. Possibly cerebral anoxia might be the common causative factor.

How can venous bleeding produce an intracranial pressure as high as this patient had? Venous bleeding will stop when the intracranial pressure exceeds venous pres-

sure. I have never heard of venous pressure as high as 650 mm. of water.

Doctor Scheinker: The increased pressure was most likely secondary to the hemorrhage. There were probably edema and swelling of the cord with complete or partial block of the subarachnoid space.

Doctor Ferris: Was there pathological evidence for spinal block in this case?

Doctor Scheinker: There was only a small portion of the cervical spinal cord available, and it is difficult to be positive about it.

Dr. A. Bernard Pasternack: Did the scattered areas of hemorrhage occur at the same or at different times?

Doctor Scheinker: Possibly at different times. Some of them showed less advanced change than the others.

Dr. Marion A. Blankenhorn: Has such high cerebrospinal fluid pressure ever been produced experimentally?

Dr. Joseph P. Evans: Not that I know of. I don't understand the high pressure. Certainly I don't believe the cerebrospinal fluid pressure would be 650 mm. if there were spinal block, unless arterial bleeding had occurred in spinal contents below the level of the block.

I don't think we have had the answer to our question of what happened to this man. Late bleeding (apoplexy) has always been a difficult thing for me to understand. There can be no question about the vasoparalysis, the histopathology is clear as far as it goes.

Doctor Rosenbaum: In a subarachnoid hemorrhage with an initial pressure of say 300 mm., one usually has to remove a good deal of cerebrospinal fluid to bring the pressure down to 150 mm. of water.

Doctor Ferris: It is only with moderately high pressure that the Ayala index holds. With such a high initial pressure in the cerebrospinal fluid as in this case, a small volume change will produce a relatively large drop in pressure.

Dr. Richard S. Austin: Was there evidence of hypoplasia of the blood vessels?

Doctor Scheinker: No, there wasn't.

Doctor Rosenbaum: Aren't the cerebrospinal fluid dynamics and pressure confused because of the marked respiratory embarrassment?

Doctor Ferris: I don't think so. As you pointed out, applied pressure (venous or otherwise) to the jugular veins or the abdomen that is lower than cerebrospinal fluid pressure will have little or no effect on the cerebrospinal fluid pressure.

Doctor Rosenbaum: With hyperventilation and blowing off of carbon dioxide there is usually a fall in cerebrospinal fluid pressure. On the other hand, an accumulation of carbon dioxide in the blood results in vasodilatation and therefore in increased cerebrospinal fluid pressure.

Doctor Ferris: That is right. I don't think carbon dioxide would have much effect on pressures this high. I have tested the effect of carbon dioxide inhalation on cerebrospinal fluid pressure and as I remember, the cerebrospinal fluid pressure has never exceeded 300 to 350 mm. of water.

Editor's Note: Since I was away from Cincinnati when this conference was held I hadn't the opportunity at clarification. It is obvious that the story in this case is incomplete due partially to the limited autopsy. Nevertheless the case is worthy of presentation and some close thinking. The reason for the disability in the lower extremities since birth is not in the least clarified by the findings presented here. It must be presumed that there was bleeding into the spinal subarachnoid space, since the clinical finding of bloody cerebrospinal fluid is not explained by the examination of the brain.

Considering the defects in our material, my concept of the case would be somewhat as follows: the patient suffered the usual type of hematomyelia and the hemorrhage dissected the medullary tissue, probably caudally as well as rostrally. One wouldn't want to try to expound the reason for hematomyelia in the present state of our knowledge on this subject; it is worth noting that the hemorrhage in the medulla was in one of the positions favored by syringobulbia.

Thenceforth I can follow the pathological interpretation as it was given above, since the patient was as well as "hit over the head by the hemorrhage, only more so"; and the reaction of small vessels thereunto might be akin to that seen in trauma. However, it cannot be stressed with enough emphasis that the *same type of vascular reaction occurs with many noxa,* e.g. after the administration of arsphenamine or the sulfonamides, in carbon monoxide poisoning, with body burns, infections, etc. It is *not a specific vascular reaction.*

There was obvious hyalinization of capillaries in the cervical segments of the spinal cord, a telltale

of hyperpiesis. This vascular change was not found in the cerebrum. The blood pressure of 160/90 about 1½ hours after what was for all purpose a rather complete physiological transection of the brain stem, draw one's attention to the possibility that hypertension existed clinically. On the other hand in consideration of the level of the intracranial pressure, a blood pressure of 160/90 might be considered as low; since some of us feel that an increasing intracranial pressure (to levels considerably below that existing here) may raise the blood pressure. Nevertheless, in the light of this case, one wonders if hematomyelia might be associated with hypertensive disease of the cord, as cerebral hemorrhage is with hypertensive disease of the brain.

Book Reviews

PRINCIPLES OF PSYCHIATRIC NURSING. By Madelene E. Ingram. Philadelphia; Pennsylvania. W. B. Saunders Company, 1944. Pp. xviii-511.

This book, written for the undergraduate student in psychiatric nursing, is easily the best elementary textbook of its kind seen by this reviewer. It is simple, direct, highly practical, extremely informative and instructive and so well written that it was a pleasure to read. It covers literally all the minor details the student nurse must know as well as those things of major importance. It does not try to make a psychiatrist out of the nurse but it does provide that instruction necessary to make a highly competent nurse out of a student.

To the student and to the teacher, this book should be invaluable, and to the psychiatrist and the general practitioner dealing with troubled relatives seeking a better understanding of mental disorders and of the care and treatment of the mentally ill, it is unequalled.

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THE MARIHUANA PROBLEM IN THE CITY OF NEW YORK. By the Mayor's Committee on Marihuana. The Jaques Cattell Press, publishers, Lancaster, Pennsylvania, 1944. Pp. xii-220.

This book, based primarily upon systematic, controlled, clinical and laboratory investigations upon 77 volunteer experimental subjects, constitutes a reliable and informative report upon the sociological, medical, psychological, and pharmacological aspects of the marihuana problem.

The findings demonstrate that marihuana in itself does not constitute the serious menace it is popularly regarded to be, that it is not too common an addiction, that the addiction is easily controlled and corrected, that there is little relationship between addiction and antisocial behavior, that physiological and psychological effects are transient and do not lead to physical or mental deterioration, and that the chief effects upon the user are a production of euphoria, contentment, satisfaction, and free play of imagination. These pleasurable effects, however, are readily transformed into unpleasant reactions by excess dosage, a consequence the user can readily and easily avoid by controlling his dosage.

While this study discloses that marihuana is a minor problem in itself, there do remain two serious unanswered questions not actually within the scope of this book but which warrant another study as well controlled as this one. Those questions concern the utilization by delinquents and criminals of the marihuana as an aid in their antisocial behavior and the question of the possible development of patterns of escape behavior to avoid facing personality problems in a manner analogous to the growing current utilization of barbiturates.

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